

**APPENDIX C:  
COMMUNICATIONS/LOW VOLTAGE SPECIFICATION FOR  
COUNTY OF LOS ANGELES PUBLIC LIBRARY**



**COUNTY OF LOS ANGELES**  
**INTERNAL SERVICES**  
**DEPARTMENT**  
INFORMATION TECHNOLOGY SERVICE  
PREMISES SYSTEMS ENGINEERING



COMMUNICATIONS/LOW VOLTAGE SPECIFICATION FOR  
COUNTY OF LOS ANGELES PUBLIC LIBRARY



SPECIFICATION FOR  
COMMUNICATIONS / LOW VOLTAGE

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1.1      SCOPE

Items of work included in this Section, described in detail in PART 3. Also refer to attached typical drawings and cut-sheets as required.

Furnish and install a complete and functional system consisting of the following components/sub-systems as indicated (checked) below:

<u>Req'd</u>	<u>System Component/Sub-System</u>	<u>Pertinent Specifications</u>	<u>Page #</u>
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- ☐ Meeting Room----- Para. 3.9
- ☐ Public Address----- Para. 3.9.1
- ☐ Data/Video Projection----- Para. 3.9.2
- ☐ Projection Screen----- Para. 3.9.3
- ☐ Equipment Racks/Mountings----- Para. 3.10

## 1.2 SPECIAL CONDITIONS

In addition to all stipulations in other portions of the general specifications, all concerned trades shall comply with the following special conditions that directly pertain to communications and security systems:

### A. Contractor Qualifications

The specified equipment shall be furnished and installed by a contractor who can show proof of having satisfactorily engineered and installed comparable systems within the past five (5) years, and who holds all legally required licenses, including General Electrical C-10 and Communication C-61 licenses.

Security system contractor must be an authorized, certified, installing dealer for Radionics, regularly engaged in the supply of security control systems, and must have occupied an established office for a period of not less than three years prior to bid date within the Project's geographic market area. The Radionics Dealer number must be supplied and verified prior to commencing work.

### B. Parts Availability

The contractor shall confirm that within a reasonable distance of the job site, there is an established agency which stocks a full complement of parts, offers service during normal working hours on all equipment to be furnished and will supply parts to the County without delay and at reasonable cost.

### C. Continuous Duty Operation

All individual components and composite systems shall be designed for continuous operation without undue heating or change in rated values and shall be properly fused.

### D. Compliance with Codes

All work shall be done in accordance with latest applicable edition of National Electrical Code and all regulations, laws, safety orders, ordinances or codes of State and local authority, whichever exceeds, having the jurisdiction. Wherever requirements in the specifications exceed those of the ordinances or codes, specifications shall govern. Nothing in the plans and specifications shall be deemed as authority to violate any of the ordinances or codes.

## 1.3 SYSTEMS RESPONSIBILITY

The contractor shall furnish and install all non-specified equipment required to make each system fully functional as per stated intent and description, without additional cost to the County.

1.4 WARRANTY

- A. All equipment and systems shall be warranted by the contractor for a period of one year following acceptance by the County. The warranty shall include parts, labor, prompt field service, and pick-up and delivery at no cost to the County. If repair of a defect cannot be affected during the initial response, every effort shall be made by the contractor to promptly correct the defect including air shipment of repair parts and replacement of the next larger assembly. **Response to initial call shall be accomplished within four (4) hours.**
- B. Routine non-warranty maintenance shall be performed by the County. Neither this maintenance nor emergency repairs made by qualified County technicians shall void the warranty.
- C. During the warranty period, the contractor shall respond only to calls for service made by ISD or designated Library Representative and shall keep the Department fully informed as to problems which develop in equipment or systems and as to steps the contractor has taken to rectify those problems. **Response to initial call shall be accomplished within four (4) hours.**

1.5 DATA TO BE SUBMITTED BY THE CONTRACTOR

A. Submittal Format

- 1. Submittal shall be furnished in an 8 ½" x 11" format in 3-ring loose-leaf binders. The cover and the title page shall bear the project name, capital project number, specification number, name of contractor and date. The document shall have a table of contents and page numbers on each of the pages including brochures and drawings.
- 2. Drawings shall be no larger than 34" x 22". Drawings larger than 8 ½" x 11" shall be folded to 8 ½" x 11" so that the drawing's name and page number are visible and can be unfolded without being removed.
- 3. Reproduced material shall not be subject to fading by light or heat and shall have high contrast for easy reading.

B. Preliminary Submittal

Within 30 days after contract award and prior to purchase of any equipment, the contractor shall submit five (5) copies of a Preliminary Submittal for review and approval. Three (3) copies to the Library Capital Project Section and two (2) to the ISD Telecommunications Systems Engineer. The submittal shall consist of the following:

- 1. Proposed material list including manufacturer's name, model number and technical data for all equipment the contractor proposes to install. Items shall be identified by specification section and paragraph number. The technical data shall consist of copies of factory issued catalog sheets or brochures, which give ratings and specifications for the proposed items.

2. Single line system diagram identifying and showing interrelationships between equipment items and how they are interconnected.
3. Shop drawings showing details of fabricated items, rack elevation drawings, console arrangements and schematics of custom designed items.
4. Statement describing exceptions being taken, if any, to the specifications wherein the submitted equipment or design varies from that originally specified.
5. If the contractor fails to list a particular variance and his submittal is accepted, but subsequently is deemed by the County to be unsatisfactory because of an unlisted variance, the contractor must replace or modify such equipment at once and without cost to the County.
6. For any exceptions that are not approved by County, contractor shall resubmit the information in complete compliance with the specifications and drawings.

C. Record (As-Built) Drawings

1. Record drawings shall be made on separate clean blue-line prints of the electrical drawings issued by the County or Architect and shall be reserved for the purpose of showing work as actually installed, including accurately dimensioned locations of all conduit stub-outs and pull boxes, routing of all conduits extending from or between buildings and locations of all telecommunications equipment not installed according to drawings.
2. Drawings shall be kept up to date with neat and legible annotations made thereon daily as work proceeds, showing work as actually installed. Additional sheets may be attached to show greater detail. Drawings shall be available at all times for inspection and shall be kept on the job at a location designated by the County.
3. Contractor at his option may use an additional set of drawings for daily field annotations. This set of drawings shall be kept at the site.
4. Final record drawings shall be submitted with floor numbers, room numbers, panel directories and all other identification necessary to conform to number designations for occupancy rather than to construction numbers. All buried conduit and/or underground conduits stubs intended for future extension shall be accurately shown as to depth and exact measurement from a permanently established landmark, such as building or structural features.
5. On completion, record drawings shall be signed, dated and returned to the County for inspection and approval before acceptance of any work.
6. Provide three (3) sets of drawings to Library Capital Projects Section and one (1) set to ISD Telecommunications Systems Engineer.

D. Final Submittal

Three (3) complete sets of the Final Submittal including a full set of the drawings on vellum shall be delivered to the Library Capital Projects Section and two (2) complete sets to the ISD Telecommunications Systems Engineer prior to acceptance tests and as a condition for final payment for the project to the contractor. It shall include all the information necessary to maintain each system, and shall consist of the following:

1. Operators Instructions (as applicable).
2. Factory-issued Service Manuals for each piece of equipment installed. The manuals shall contain complete parts lists, detailed schematics, circuit descriptions, maintenance procedures and trouble-shooting methods. In the event such manuals are not available from the factory, it shall be the responsibility of the contractor to compile and submit the required information.
3. A System Manual for each system furnished. This manual shall complement the above service manuals with all necessary additional information unique to the system that is not otherwise provided, such as a list of applicable service manuals, options selected, jumper or strapping choices, modifications, and detailed wiring information.
4. Record Drawings (see Paragraph 1.5, C.5).
5. One (1) electronic copy of communications drawings in AutoCAD 14 format shall be delivered to Library Capital Project Section and to County ISD Telecommunications Systems Engineer

E. Addresses

1. Library Capital Projects Section  
7400 E. Imperial Hwy  
Downey, CA 90242
2. ISD Telecommunications Systems Engineer  
1112 N. Eastern Ave  
Los Angeles, CA 90063

1.6 TELECOMMUNICATIONS ROOMS

To complete the installation, testing and cut-over of the telephone and other sub-systems in a timely manner, the contractor shall give a high priority to completing ALL of the following as soon as possible and no later than four (4) weeks prior to the scheduled completion target date. Library Capitol Projects Staff and ISD Telecommunications Engineer also require immediate notification of any changes in the target date. Failure to comply with these conditions can and will result in communications systems in-service, and occupancy, delays. Refer to typical drawings and cut-sheets as required.

**At no time will air conditioning units, condensate lines, water heaters, or any type of water lines, except fire sprinklers as required by code, be placed above any telecommunications room. No exceptions will be considered.**

A. Communication Rooms Designations

1. **Building Entrance Facility Room (BEFR) (Formerly designated as MPOE)**

The communications cables from the local telephone company, the Minimum Point Of Entry or MPOE, are terminated in this room. It will house any telephone company equipment necessary to provide service to the County. This room may be included in the MCR if the Library is the only facility to be serviced from it.

In the case of a multi-tenant facility, this room will not be accessed through the Library. At no time will Library voice or data equipment be placed in this room.

2. **Main Communications Room (MCR)**

This room houses the Telephone system and main data communications equipment. The telecommunication cables from the BEFR, close workstations (as designated by ISD Telecommunications Systems Engineer), and TR's (if necessary), are terminated here. Intrusion Alarm equipment, Card Access System equipment, Paging equipment, etc. is housed in this room.

The MCR shall be located in the building in such a way that it is assessable only from the Library Staff workroom. Additionally, it shall be placed such that no data cabling, when installed and terminated, will exceed **275 feet** or **current EIA/TIA Standard**.

The MCR shall be equipped with furniture to provide a worksurface for technical staff. This may be in the form of a fully supported drop down worksurface. This should be at a height that is comfortable to work at standing. A "bar-type" stool shall be provided for sitting. It will also be equipped with an 18" deep bookshelf about the worksurface. The length may be determined in the field. If the size of the room permits, a desk and chair should be provided in place of the drop down worksurface.

3. **Telecommunications Rooms (TR) (Formerly designated as IDF)**

The ISD Telecommunications Systems Engineer along with appropriate Library Staff will determine if additional Telecommunications rooms are required. If required, the room shall be designated TR 1.2 for the first room on the first floor and TR 2.1 for the first room on the second floor, and so on. These rooms will house data communications equipment and cable terminations as required. The telecommunications cables from close workstations, as designated by ISD Telecommunications Systems Engineer, will be terminated here. It will also include Intrusion Alarm and Card Access equipment as necessary.

B. Air Conditioning

The MCR shall be provided with 24 hour, 7day air conditioning. Under normal operating conditions, a separate duct zone connected from the main building system shall provide **COOL AIR ONLY** in the MCR. If the main system fails to operate or maintain the required ambient temperature, a standby emergency system shall be automatically activated. Both systems shall be provided and installed with separately controlled

thermostats. The MCR shall NOT be under the control of any building energy conservations systems (BEAS). A temperature of 70 degrees Fahrenheit and a relative humidity range of 40% to 60% shall be maintained at all times. Before ANY communications equipment can be activated, a live test of the air conditioning system shall be conducted in the presence of the ISD/Telecommunications Systems Engineer or his/her designee.

**NO air conditioning units (HVAC), condensate lines, water heaters, or types other water lines other than fire sprinklers as required by code, may be mounted directly above any MCR or Telecommunications Room (TR) unless otherwise approved in writing by the ISD Telecommunications Systems Engineer. In multi-story buildings, where TR's are placed directly above MCR's, or other TR's, (i.e. building risers) air conditioning/heating vents and ducts shall not be placed in the ceiling space directly under the TR.**

C. Electrical Requirements

Install dedicated and isolated 20 amp electrical outlets, one (1) outlet (4 plugs) per circuit, in the MCR and IDF as shown on the plans.

D. Fire Protection

Provide a smoke detector and a high temperature sensor in the MCR and IDF, connect them to the fire alarm panel as two different zones. A fire extinguisher, of the type recommended for use on the electrical fires, shall be installed on the wall just inside the door, where it can be reached without completely entering the room. If the building is equipped with fire protection, all Telecommunications Rooms, shall have a Pre-Action System.

E. Backboards

Install fire-retardant, 3/4 inch plywood backboards covering all walls, from the floor to above the ceiling grid. Backboards shall painted off-white.

F. Door Locks

Install a door lock mechanism for all Telecommunications Rooms, keyed separately from all other keys.

G. Lighting

Lighting intensity in all Telecommunications Rooms shall be 90-100 foot-candles at 36 inches above finished floor. The bottom of lighting fixtures shall be 9 feet above finished floor.

G. Grounding

The grounding in all Telecommunications Rooms shall be a #2/0 AWG insulated ground cable from main building ground and terminate on a ground bar. See detail drawings.

I. Flooring

Coordinate with architectural plans and provide Anti-static vinyl flooring, Armstrong Static Dissipative Tile (SDT) Excelon Resilient Tile Flooring, or approved equivalent, in all Telecommunications Rooms. Anti-static vinyl flooring must be grounded to main building ground.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS AND EQUIPMENT**

All materials and equipment shall be new, unused and manufactured within eighteen months prior to installation. Where applicable, all materials and equipment shall be listed by Underwriters Laboratories.

### **2.2 EQUIVALENT MATERIALS AND EQUIPMENT**

Manufacturers' names and model numbers are used herein only as a means of establishing standards of quality and performance. Comparable equipment of standard manufacture and established reputation, which meets the requirements outlined above, may be submitted to ISD Telecommunications Systems Engineer for approval. Equipment of the following manufacturers may be used if it meets or exceeds parameters of the specified equipment.

- A. Intrusion Alarm - Radionics
- B. Access Control System - Hirsch/HID
- C. Door/Window Sensors - Sentrol
- D. Sirens - Sentrol
- E. Photo Electric Beam Motion Detectors - Detection Systems
- F. Cable - Superior Essex, Belden, West Penn, Berk-Tek, General
- G. Panic Button - Suspicion, Edwards, Soundolier,
- H. Paging Amplifier - Bogen
- I. Community Room Public Address - TOA, Rauland
- J. Loudspeaker/Transformer - Soundolier, Rauland, Quam
- K. Loudspeaker/Enclosure/Baffle - Soundolier, Bogen, Dukane
- L. Volume Control - Soundolier, Lowell, Dukane, Quam, Bogen
- M. Distribution Amp - Pico Macom
- N. Public Area and Emergency Exit Doors Panic Hardware - Von Duprin Series #99, Series #33 or Detex.
- O. Door Bell/Door Phone - Viking

## **PART 3 SYSTEMS**

### **3.1 SYSTEM & AUXILIARY EQUIPMENT PRE-INSTALLATION REQUIREMENTS**

Electrical contractor shall install station conduits, riser conduits, cable trays and conduit hardware as shown on the drawings and according to procedures described under heading Part 4. H. Conduit.

The Telecommunications Rooms shall be constructed as shown on the drawings and according to procedures described under heading Part 1.6. HVAC system in the MCR

shall be operational 24-hour, 7 days a week. The heat dissipation of the communications equipment in the MCR is about 20,000 BTU.

General contractor shall coordinate with cable contractor for the cable installation and schedule.

Ceiling contractor shall be responsible for removal and replacement of ceiling tiles to accommodate the telephone/data/security cables installation.

Electrical contractor shall coordinate with the communication contractor to install conduits as required for the all systems and the 120V-24VDC transformer for electronic door lock devices at card reader locations as necessary.

Low voltage contractor shall furnish and install cable hangers with Caddy Clips in the attic, 4 hangers per 16 square feet, to support voice/data/ security cables as required by codes. All cables shall be installed prior to the installation of the ceiling grid if possible. The low voltage contractor shall be responsible for any damage, physical or cosmetic, to ceiling tiles. Electrical contractor shall be responsible to coordinate with cable contractor for the cable path requirement.

## BUILDING SYSTEMS

### 3.2 SECURITY

#### 3.2.1 INTRUSION DETECTION AND ALARM

##### A. System Description and Installation Requirement

The intent and purpose of this system shall be to provide a security/intrusion entry alarm system in the building. All perimeter doors, roof hatches, or other external entry points shall be equipped with dedicated concealed magnetic contact switches. Interior protection shall be provided by combination passive infrared/microwave detectors and glass break sensors located as indicated on the drawings.

The alarm siren(s) shall be installed in the plenum above the keypad(s) as indicated on the drawings. Each alarm device shall report to the County Central Station as a separate point. Use point expander OctoPopit module(s) for the point expansion of the alarm panel and a separate enclosure(s) D8103 to house the expansion device(s). Install alarm cables home run from each alarm device to the panel. Appropriately sized "end of line" resistors shall be placed at the device end only. Installation of modules, devices and wiring shall be in accordance with Radionics design, engineering standards. Additional Power supplies, Batteries, OctoPopits, OctoRelays, and associated cables shall be mounted in additional D8103 cabinet(s). Maximum build out per D8103 or enclosure shall be 5 modules and or 2 7AH/12V batteries.

Installation of modules, devices and wiring shall be in accordance with current Radionics design, installation, and engineering standards. Additional D8132 Battery Charger / power supplies, batteries, OctoPopits, OctoRelays, and associated cables shall be mounted in additional D8103 cabinet(s). Maximum build out per D8103 or enclosure shall be 5 modules and or 2 each 7AH/12V batteries

The intrusion alarm cables shall be installed horizontally through the ceiling area in a neat and orderly fashion and supported by cable hangers at appropriate intervals. The cables shall be positioned at least six (6) inches from electrical equipment, electrical wiring, telephone cabling, intercom cabling and data wires. Exposed wiring shall only be permitted above ceiling level or ten feet from floor level. The installation shall comply with the County of Los Angeles Building Safety and Fire Codes. Contractor shall furnish, at his expense, all permits issued for scope of work. Contractor shall supply copies of all permits acquired.

The Radionics D7412/9412 Alarm Communicator Panel and associated equipment enclosures shall be installed in the MCR room. Clearance in front of all cabinets shall be a minimum of 36 inches. The alarm shall report to the County Central Station. Library Staff shall be responsible for obtaining an alarm permit from the local law enforcement authority.

The Radionics Alarm Communicator Panel shall power all peripheral alarm devices for 24 hours of standby time with 5 minutes in alarm condition conforming to NFPA 72 central station requirements in the event of power failure. Radionics load calculation worksheet page 61 & 63 of document 74-07692-000-D shall reflect all security equipment component current loads, standby battery requirements and standby battery calculations. Additional D8132 battery charger modules and batteries shall be installed in Radionics D8103 enclosures. All transformers shall be mounted in D8004 enclosures. The intrusion alarm equipment shall have a dedicated branch circuit identified and labeled with panel and branch circuit number on power receptacles covers.

Terminations and connections throughout system shall employ terminal strips with rising wire clamp screws or solder terminals, all in cabinets or enclosures. Telephone punch type blocks, and electrical wire nuts are not acceptable. In cases where shielded cable is used, all shields will be grounded.

The alarm contractor shall be responsible for programming and testing the alarm panel in the local mode. The alarm contractor shall furnish the County with completed Radionics programming sheets and As-Built 8½" x 11" drawings(s) that indicate each device/point location identified to reflect 16 character idle text in programming on not less than 12 point text on floor plan. The alarm contractor shall submit as-built drawings as outlined in paragraph 1.05,D,1-5.

The alarm contractor shall be an authorized and current direct Radionics Dealer. The contractor must provide proof of dealership with Radionics, INC. as well as verification of prior experience with Radionics Controllers and System design, Detection Systems and have experience with programming system features. The installer must provide proof of training via a valid training certificate. Certificate must have been issued more than six (6) months and less than five (5) years prior to installation date. **Proof of dealership must be attached to this quotation.**

The alarm contractor shall be responsible for programming and testing the alarm panel in the local mode. The alarm contractor shall furnish the County with completed Radionics programming sheets and As-Built 8½" x 11" print(s) that indicate each device/point location identified to reflect unique and descriptive 16 character idle text in programming on not less than 12 point text on floor plan. The alarm contractor shall submit as-built drawings as outlined in paragraph 1.05,D,1-5.

The alarm contractor shall program the system to activate or arm at a time to be determined (see ISD Project Manager for coordination) each night except Saturdays, Sundays, and Holidays. The system will automatically disarm at 6:00A.M. or by authorized staff or on-site security staff.

The alarm contractor shall provide hands on training to County staff in the operation of the system. A roster of attendees shall be documented..

If the intrusion alarm system is to be integrated with the access control system, the control panel will incorporate by means of programming and wiring logic, one or more input area disarming points and output area armed relays that will disarm the area(s) when armed, by means of a momentary contact closure received from the access control system. These areas may differentiate between perimeter and interior protective devices. Contact the Project's ISD Telecommunications Systems Engineer for details.

**B. Materials and Equipment**

- a. Digital keypad – Radionics model D1255 Alpha IV.
- b. Alarm panel – Radionics model D7412 or D9412, **RAM IV** or greater software.
- c. Passive infrared / microwave detectors – Detection Systems DS970 (Long Range).
- d. Passive infrared / microwave detectors – Detection Systems DS950 (Med. Range).
- e. Passive infrared / microwave detectors – Detection Systems DS937 (360 ).
- f. Glass break sensor – Sentrol 5810A.
- g. Siren/Speaker – Sentrol MPI36.
- h. Magnetic door contact switch, flush mount – Sentrol model 1078CT.
- i. Magnetic door contact switch, surface mount, non-exposed wiring – Sentrol 1042TW
- j. Magnetic door contact switch, surface mount, exposed wiring – Sentrol model 2505A.
- k. Magnetic door contact switch, floor mount – Sentrol model 2707A.
- l. Transformer enclosure – Radionics model D8004.
- m. Non-fire enclosure – Radionics model D8103.
- n. Battery – D126 two (2) required for fire panel.
- o. Transformer – Radionics model D1640.
- p. Keypad back boxes – Radionics model D56.
- q. Aux relay – Radionics model D136.
- r. Phone jack, modular – Radionics model D128.
- s. Battery charger – Radionics D8132.
- t. OctoPopit – Radionics 8128C.
- u. OctoRelay – Radionics D8129.
- v. Transformer kit – Radionics D8004.
- w. Dual Phone line monitor – Radionics D928 (Fire alarm applications)
- x. Alarm cable – plenum rated, stranded, PVC insulated, unshielded, 20 gauge or larger, 2 pair twisted wire for keypad, glass break sensors and passive infrared / microwave detectors. Plenum rated, stranded, PVC insulated, unshielded, 20 gauge or larger, 1 pair twisted wire for door switches.
- y. Shielded wire shall be required if Radionics noise immunity design thresholds will be exceeded.
- z. All other cables and hardware as required to make the system fully functional.

### 3.2.2 ACCESS CONTROL SYSTEM

#### A. System Description and Installation Requirement

The intent and purpose of this system shall be to provide Card Access Control, if required. The system design follows:

The system design utilizes a Hirsch Velocity Software System design. There will be one server computer, as designated on the drawings. The software will allow for Library Staff to control access for only their doors and employees through the programming of the restricted database feature on the Access Control System Software. A second, remote computer may be required and installed as designated on the drawings. The system will provide the capability for remote access database management.

If required, the system shall be integrated with the intrusion alarm system for after hours access to disarm areas independent of the other. This shall incorporate an access level output unique to a class of cardholders that when presented, will provide a dedicated momentary relay closure to disarm the intrusion alarm control system.

The General Contractor shall provide verification of prior experience with Hirsch / HID software based systems, and have experience with programming the restricted database feature.

The General Contractor shall furnish and install all proximity card readers as indicated on the drawings. The card readers shall be connected to locking devices on the doors at the locations specified on the drawings. To comply with ADA code requirements, all proximity card readers shall be installed within six (6) inches of the door they are controlling.

Each door shall have its own dedicated, magnetic door contact switches at the card reader location which shall connect to the card access panel to reset the locking device at the door when opened.

The locking devices must be rated at 24Vdc. For Continuous Duty. Power supplies for the locking devices shall be mounted remotely in the nearest Telecommunications room (MCR, TR1.1, etc.).

Cabling shall incorporate wire gauge conductors that reflect less than a 10% voltage drop to any access control component.

The General contractor is to program system configuration and restricted database feature. There will be no equipment substitutions accepted in the Checkpoint entry system section. The Contractor shall provide fifty (50) initial cards with the system. The Contractor shall be responsible for initial programming of all requested time zones, access levels, card users and cards. The contractor shall be responsible to provide a minimum of four (4) hours user training on system use, programming, backing up critical database files and creating report templates.

The general contractor shall furnish and install the **Fail Secure** door locks. The purpose is to ensure that the door will stay latched in case of power failure. Panic hardware shall be provided on all Fail Secure doors for egress as specified on the drawings. Any penetrations of doors after UL Listing shall require UL re-certification.

Properly bond and ground all shields.

Provide UPS for ALL system components and equipment, including servers, workstations, monitors, enrollment stations, and accessories, for up to four (4) hours continuous use.

#### B. Materials and Equipment

- a. Hirsch system to be determined.
- b. Proximity reader – Universal wire – 5 wire conductor. HID
- c. Proximity card – To Be determined.
- d. Main Controller - To be determined
- e. Terminal controller – Checkpoint AC-603.
- f. Altronix SMP10-CTX Power Supplies
- g. Altronix SMP3-CTX Power Supplies
- h. UPS – APC Smart-UPS 1000VA USB & Serial XI. 120V. Part Number: SUA1000XL.
- i. 12Volt Backup Batteries for each panel, as required for four (4) hours
- j. PC – **Minimum requirements** – Intel Pentium IV 800 MHz, 512 MB memory, 20 gigabyte hard drive, 40X CD-ROM drive, CD-ROM-RW, floppy drive, US Robotic 56K modem, 15 inch monitor or better for both server and workstation. The operating system shall be Windows NT 4.0 with Service Pack 6 or greater.
- k. Electrified Schlage Mortise Lock Bodies with hinge.
- l. Von Duprin Panic Hardware Series #99 or #33 (as required) with electrified lever trim and Von Duprin electric power transfer unit #EPT-218.
- m. Sentrol Door Contacts Style 1078CT
- n. Magnetic door contact switch, flush mounted and closed loop.
- o. Isolation Relays (For Elevator Control).
- p. Cable – Magnetic door contact switch, plenum rated, stranded, shielded, 18 gauge minimum, 2-pair wire.
- q. Cable – Card reader to terminal controller, plenum rated cable, 6 wire, 18 gauge minimum, stranded with overall shield.
- r. Cable – Panic bar lock, plenum rated, stranded, 14 gauge minimum, 2 conductors with overall shield.
- s. Cable – Electric strike, plenum rated, stranded 14 gauge minimum, 2 conductors with overall shield.
- t. All other cables and hardware as required to make the system fully functional.
- u. Fifty (50) cards for use with the system.

#### 3.2.3 RESTROOM DOOR RELEASE

A. System Description and Installations Requirement

The intent of this system is to provide a door release from the Circulation Desk and the Children's Desk as required for the restroom door. It requires that a line of sight be established between the restrooms and the door release button. It may be incorporated with the Door Communications System in Section 3.2.4. It may also be integrated with the card access or intrusion alarm systems, Sections 3.2.1 and 3.2.2 respectively as required.

Contractor shall provide submittals for the system to include design and hardware required for making the system operational prior to ordering and installation for approval and sign-off by ISD Telecommunications Systems Engineer. The power supply shall be installed in the MCR. The door locking devices must be rated at 24-VDC for continuous duty.

It is the responsibility of the Contractor to coordinate with the general building contractor, electrician, or door contractor for installation schedule and to deliver a fully functional system.

B. Materials and Equipment

- a. Power supply – 25Vdc, 3Amp with battery backup
- b. Electric Strike – Von Duprin
- c. Door button – Rutherford surface button
- d. Cable – 18 gauge, CMP twisted pair.

3.2.4 DOOR COMMUNICATIONS

A. System Description and Installations Requirement

The intent of this system is to provide communications for various doors throughout the facility. The doors requiring communications will be identified by the Library Capitol Projects Staff and ISD Telecommunications Systems Engineer. The staff entrance shall incorporate a two-way weather and tamper resistant phone that shall interface with the telephone system. The telephone system will be programmed to alert on selected phones when a call is made from the door phone. When a caller is authorized to enter, the receiver will select the appropriate code via the telephone keypad which will be passed to the door lock, releasing it for entry.

B. Materials and Equipment

- a. Door Phone – Viking W-1000 or W-2000a
- b. Door Entry Controllers – Viking C-1000, RC-2a, RC-3 (as required)
- c. Flush Installation pre-wire box – Viking rough-in box P/N 259576
- e. Surface/Vandal Resistant Mounting Box – Viking VE-5x5 Enclosure (as required)

3.3 PUBLIC ADDRESS SYSTEM

A. System Description and Installation Requirement

The intent of the system is to provide voice paging. The system will cover the entire library area. If zones are used, a maximum of three (3) zones will be assigned. The zones are 1) Staff, 2) Public, and 3) Emergency. The system will originate through the telephone system. Requirements shall include:

The paging equipment shall have 600 ohm balanced input for connection to the telephone system.

All speaker assemblies shall include a back box, grill and line matching transformer. The speakers shall include a built-in, screwdriver adjustable volume control and be equipped with a 25-volt line-matching transformer set on one (1) watt tap.

The paging system will allow for paging over the telephone instruments, overhead speakers, or both simultaneously.

The general paging equipment for the building shall be installed in the MCR and connected to the Norstar Meridian telephone system paging port using an RJ14-to-Spade terminating cable. It shall be mounted on the designated plywood backboard as indicated on the drawings. The communications contractor shall provide the telephone connection at an interface block.

The amplifier shall be sized appropriately to support all speakers.

The speaker cables shall be shielded twisted one (1) pair, 20 AWG, and CMP rated. The speaker cables shall be installed horizontally through the ceiling area in a neat and orderly fashion and supported by cable hangers at appropriate intervals. The speaker cables shall be positioned at least six (6) inches from telephone and data wires. The installation shall comply with ALL applicable Building Safety and Fire Codes.

#### B. Materials and Equipment

- a. Amplifiers – Solid state, 100 watts RMS, 25/70-volt output, Bogen model TPU-100B.
- b. Control modules – Bogen PCM-2000, Bogen ZPM-3, or Valcom V-2003A
- c. Power supplies – Atlas/Soundolier model PS24 series or as required
- d. Speaker – 8", 8 ohm, with 25/70 volt transformer and volume control, Quam model C5 VK or VS series.
- e. Speaker enclosure – Quam model ERD 8 series.
- f. Ceiling mounting bracket – Quam model SSB-2.
- g. Open Truss Ceiling enclosure/mount – Atlas/Soundolier Model X8609
- h. Optional suspension hanger for X8609 – Atlas/Soundolier 435 in appropriate length
- i. Speaker cable – shielded twisted pair AWG #20, plenum (CMP) rated.

### 3.4 VIDEO

#### 3.4.1 CCTV

##### A. System Description and Installation Requirement

The communication contractor shall install networked, color IP addressable, CCTV cameras where shown on the drawings. The image will be displayed using an "internet browser" on selected workstation PCs. A Digital Video recorder shall be installed at a location to be determined by the ISD Telecommunications Systems Engineer and Library Staff.

It is the responsibility of the communications contractor to coordinate with the general and electrical contractors for the installation schedule and to deliver a fully functional system.

**B. Material and Equipment**

- a. Camera – Axis Network Video Camera 2120.
- b. Power Supply – Altronix ALTV248
- c. Viewing Software – Sharkseye Terrio LE
- d. Digital Video Recorder – Pelco DX3000 Series
- e. Video Receiver – NET101R-A | Single-channel video receiver with bi-directional audio and integrated Ethernet connection.
- f. Video Transmitter – NET101T-A | Single-channel video transmitter with bi-directional audio and integrated Ethernet connection.
- g. Cable – West Penn Plenecom
- h. Cable – RG-6/U Type CATV/MATV Coaxial Cable Coaxial Cable 69. Gas injected foam polyethylene.
- i. Cable – RG-59/U, plenum rated.
- j. Connectors – as required. All faceplates shall be electrical Ivory
- k. Tamperproof ceiling housing – Burle TC9366H.
- l. Housing (outdoor) – PELCO EH 3512, w/wall mount EM1450.
- m. Housing (indoor) – PELCO EH 3010, w/wall mount EM 1400.

**3.4.2 MATV**

**3.4.3 SATV (Satellite)**

**3.4.4 CATV (Cable Access)**

**A. System Description and Installation Requirement**

The intent of the system is to provide UHF/VHF/FM signals to the building. The system shall consist of a local cable TV company drop, internal coaxial cable, a distribution amplifier, and \_\_\_\_\_ ( ) drops as indicated on the drawings. The communications vendor shall use pads as necessary to prevent overload of the signal.

**B. Materials and Equipment**

- a. Distribution Amplifier – Pico Macom, INC. TA-52, wall mounted (if necessary).
- b. Cable – West Penn Plenecom
- c. RG-6/U Type CATV/MATV Coaxial Cable Coaxial Cable 69. Gas injected foam polyethylene.

- d. External cable P/N AQC841 Moisture Blocking (if required)
- e. Internal cable P/N 25841
- f. Connectors – as required. All faceplates shall be electrical Ivory

#### 3.4.5 TELECONFERENCE SYSTEM

### 3.5 CABLING SYSTEM

#### 3.5.1. Station Cable (Voice/Data)

- a. The communications contractor shall be responsible for obtaining a low voltage installation permit from the appropriate authority before starting of installation.
- b. The communications contractor shall be responsible for consulting with the building inspector to determine whether there are special local requirements for strapping the cables in the attic area.
- c. The communications contractor shall be responsible for coordinating with the building's General Contractor to determine the cable routings, schedules for cable placement and ceiling inspection.
- d. The communications contractor shall provide installation of the cable hangers and sleeves that will support the horizontal cables in the attic area per all applicable local building code(s).
- e. The communications contractor shall furnish and install voice/data locations, voice only locations, and data only locations per approved floor plans.
- f. The communications contractor shall furnish and install whips, wall plate adapters and floor plate adapters as shown on the drawings.
- g. All voice/data outlets shall be furnished and installed complete with two (2) voice jacks (Cat 5e, RJ45) and two (2) data jacks (Cat 5e, RJ45) terminated with two (2) voice and two (2) data plenum rated cables unless otherwise noted on the drawings.
- h. The data cables shall be either Berk-Tek LANmark-350 UTP or General Cable PlatinumPLUS Category 5e plenum rated 24 AWG four pair. The jacket shall be blue. Furnish and install two data cables at each jack location. All data cables shall be installed from the station jack directly to the appropriate Cat 5e patch panels in the MCR. All data cables shall be tested to minimum Cat 5e standards.
- i. The voice cables shall be either Berk-Tek LANmark-350 UTP or General Cable Category 5e plenum rated 24 AWG four pair. The jacket shall be white. Furnish and install two voice cables at each jack location. The voice cables shall be installed from the station jack directly to the appropriate Cat 5e patch panel in the MCR. All pairs are to be terminated using TIA/EIA 568-A at both ends. All voice cables shall be tested to minimum Cat 5e standards.

- j. The jack housings and faceplates shall have four (4) positions for jacks. Blank covers shall be installed in vacant jack positions. Jack housings and faceplates shall be compatible with the Mini-Jacks. The type and color is to be determined by the installed location. Some will be flush or non-flush. Modular furniture faceplates shall be color coordinated with the color of the furniture base plate. It will be the selected communications contractor's responsibility to furnish and install the proper jack housings and faceplates. The communications contractor shall determine the type of faceplate prior to the scheduled installation and must be approved by ISD Telecommunications Systems Engineer and Library Staff prior to use.
- k. Floor monuments will be flush mount, single gang, and fully adjustable, with minimum of two (2) each one (1) inch conduit openings, unless otherwise noted on the plan. The Walker/Wiremold 880M1 Omnibox or 880W1 shall be used unless otherwise noted on the plan. Where applicable, the Walker/Wiremold 817B flange, AC-MAB, 828GFI cover, AC-QP106 Quad telecommunications frame, and Walker/Wiremold 828R Brass Electrical Duplex Cover Plate, unless otherwise noted on the plan. Any deviation must receive written approval from the ISD Telecommunications System Engineer and Library Staff prior to use.
- l. Floor monument mounting plates shall be Panduit CF-1064EI.
- m. The communications contractor shall furnish and install patch panels and wire organizers. Separate patch panels shall be provided for the PUBLIC and STAFF areas. The patch panels shall be Panduit Mini-Com 48 port all metal modular, part number CP48BL. The wire organizers shall be Panduit WMPH-2. Furnish one (1) organizer per patch panel plus one (1) additional wire organizer at the top of each row of patch panels. Be sure to include the Mini-Jacks for the patch panel. Vertical wire minders shall also be furnished and installed as required using Panduit WMPV-C45 and Panduit WMPV-S45.
- n. The RJ45 data jacks shall be wired according to TIA/EIA 568-A.
- o. All jacks shall be modular Panduit Mini-Jacks. The voice jacks (Cat 5e, RJ45) shall be Mini-Jack part number EI5388EI (Electrical Ivory). The data jacks (Cat 5e, RJ45) shall be Mini-Jack part number CJ5E88OR (Orange) or CJ5E88BU (Blue) as shown on the plan.
- p. The PUBLIC areas shall use Blue data jacks. The STAFF areas shall use Orange data jacks.
- q. All voice/data jacks and patch panels shall be labeled according to Los Angeles County standard 802. Labels are to be typed or drawingsed with a labeling device and permanently affixed. No hand written lettering is acceptable. The labels shall be drawingsed on white tape with black lettering for jacks. Patch panels shall be labeled both front and back. The patch panel labels shall be black tape with white lettering, four (4) labels per strip. See the ISD Telecommunications Systems Engineer if further clarification is needed.

Sample Labeling: Voice – VYxxx      (Voice cables are not split, but require separate

Data -- DYxxx

cable for each, Y = Floor number, xxx = cable number beginning with 001.)

- r. All wire and cable runs in the ceiling area shall be supported with ceiling hangers, supplied and installed by the selected communications contractor. Cables must be supported at a space interval that is allowable by code. At no point shall cable(s) rest on acoustic ceiling grids, panels or lighting support wires.
- s. Cable shall be installed in continuous lengths (no splices allowed) from origin to MCR, using the shortest route possible, and shall be bundled in groups of not greater than 40 cables.
- t. Four pair data cables shall be bundled with a Velcro type of tie, such as Panduit HLS, HLM, HLC or equivalent. Do not use plastic ties on data cables.
- u. Furnish and install flexible tubing (Seal Tite) to conceal wire runs into modular furniture or where needed to secure multiple exposed cables.
- v. It shall be the responsibility of the communications contractor to determine and furnish the quantity of voice/data wire needed.

### 3.5.2 Workstation Outlets

- a. Unless otherwise noted on the drawing, each outlet location installed in the wall, on the modular furniture system and on the floor shall be equipped with two (2) Category 5e RJ45 type voice modular jacks, Electrical Ivory in color and two (2) Category 5e RJ45 type data modular jacks, Orange for the STAFF locations and Blue for the PUBLIC locations as shown on the plan.
- b. Each outlet location shall be provided with two (2) voice cables and two (2) data cable. Unless otherwise indicated on the plan, voice cable pairs shall NOT be split between the two (2) jacks and shall be fully terminated.
- c. Voice jacks in the field shall be Category 5e, 8 position, 8 wire with termination cap color, wired to the TIA/EIA 568-A wiring standard. Data jacks shall be Category 5e, 8 position, 8 wire with termination cap color, wired to the TIA/EIA 568-A wiring standard. Voice jacks as manufactured by Panduit (CJ5E88EI). Data jacks as manufactured by Panduit (CJ5E88OR or CJ5E88BU) as shown on the plan.
- d. Panduit (CFPE4) shall mount jacks on a four- (4) module, Electrical Ivory, faceplate for the wall.
- e. Where outlet location is specified for a wall-mounted telephone, provide and install a voice cable terminated on a RJ25 jack with a single module faceplate by Panduit (CJ641EI).
- f. Provide and install appropriate faceplate, extender as determined by modular furniture brand. The communications contractor shall determine bracket type and color prior to scheduled installation.

- g. If faceplates are mounted to double gang boxes, the communications contractor shall provide and install, as required, In-Wall box adapters as manufactured by Panduit.
- h. The communications contractor shall be responsible to install cover plates or blank modules of the appropriate color on any unused single or double gang boxes. Modules by Panduit (CMB).
- i. Data jacks shall occupy the bottom positions on the faceplate. Data jacks in horizontally oriented faceplates shall occupy the right-most positions.
- j. The communications contractor shall provide cross-connect jumpers as required from the MPOE to MCR, between MCR's and IDF's and for faxes, modems, elevator phones, etc. as required.
- k. Any deviation/substitution must be verified and approved in writing by the ISD Telecommunications Systems Engineer prior to use.

### 3.5. DISTRIBUTION CABLE (where applicable)

#### 3.5.1. Voice Cable

- a. The communications contractor shall provide, install and terminate an appropriately sized, as determined by the ISD Telecommunications Systems Engineer and Library Staff, CMR rated cable to provide connectivity between the MPOE and MCR.
- b. Backbone cables shall be installed separately from the station cables. Where both cables are installed in a cable tray or wire way, backbone cables shall be installed first and bundled separately from the station cables.

#### 3.5.2. Fiber Optic Cable

- 1. If required, fiber optic cable shall be jacketed as appropriate for use in an underground environment.
- 2. The cable shall be composite, tight buffered, all dielectric, Kevlar strength members with polyethylene outer jacket (medium or high density) with 600 lbs pull-strength. Individual fibers shall be covered with a 900-micron primary buffer. The cable shall contain continuous glass with Corning or Lucent Technologies glass only, and no splices.
- 3. The cable shall consist of 8 Multi-mode fibers and 4 Single-mode fibers and shall meet or exceed the following specifications.
  - a. Multi-mode: diameter (microns) 62.5/125; dual window (850/1300): maximum attenuation @ 850/1300 nm < 3.15/1.5 db/Km; minimum bandwidth (MHz-km) @ 850/1300 nm, 160/500; graded index.
  - b. Single-mode: diameter (microns) 8.3/125; dual window (1310/1550) maximum attenuation @ 110/1550 nm, < 4.3 db/km.

- c. The communications contractor shall ensure that the multi-mode fiber optic cables can support FDDI, 100Base-FX, and 1000Base-FX protocols, and the single-mode fiber optic cables can support 1000Base-LX and 1000Base-SX protocols.
- d. The communications contractor shall furnish and install a rack mounted 12-port fiber distribution enclosure by Siecor or equivalent, fully equipped with couplers in the MCR.  
Note: The Fiber Patch Panel Assemblies shall be mounted above the core chassis' on the relay racks.
- e. The communications contractor shall furnish, install and terminate all fiber optic strands on ceramic type of ferrule connectors in each distribution enclosure, install SC type of connectors for the multi-mode cables and FC/PC (Physical Contact) for the single-mode cables.
- f. The communications contractor shall also furnish and install one-inch diameter inter-duct for fiber runs.
- g. The communications contractor shall furnish and install each span of the fiber optic cables in one continuous length, no splices, utilizing building conduits and sleeves.
- h. The communications contractor shall provide hardware for termination and cable securing, such as clamps, tie-raps, soft buffer, spiral wrap or split loom, SC connectors, etc.
- i. The communications contractor shall leave at least ten (10) feet of fiber optic cables slack on top of cable tray.
- j. The communications contractor shall provide other services, if required, to complete, such as: tighten barrel connectors, secure cable to fiber distribution panel, and install connectors to couplers, place fiber distribution enclosures in rack.

### 3.6 CABLE TESTING

#### 3.6.1. General

- a. All testing shall be per the Los Angeles County STD-902 Testing Standard. An orientation with the ISD Telecommunications Systems Engineer and Library Staff shall take place on site prior to the test. It shall be scheduled at least one week in advance. The ISD Telecommunications Systems Engineer and/or Library Staff shall certify prior to testing the following:
- b. Test meters have been calibrated to TIA/EIA Standard within the last 12 months. With a Certificate of Compliance, meter serial number and dated.
- c. Test meter shall be fully charged.
- d. Test configuration set to the County Standards.

- e. Manufacturers warranty certification (if applicable) requirements shall be reviewed to ensure that all warranty requirements are met.
- f. The communications contractor shall furnish three (3) drawingsed copies and one copy on CD-ROM, with the complete set of test results. Copies of PC based software to view drawings and results shall also be provided to the ISD Telecommunications Systems Engineer and appropriate Library Staff.

#### 3.6.2 Communications Contractor Requirements

- a. Communications Contractor shall provide sufficient skilled labor to complete testing within the agreed upon test period. Testing shall commence no later than \_\_\_\_\_ and be completed no later than \_\_\_\_\_.
- b. Communications Contractor company shall have a minimum of 3 years experience installing and testing structured cabling systems. All installers assigned by the Contractor to the installation shall have factory certification that they are qualified to install and test the provided products.
- c. Communications Contractor is responsible for supplying all of the required test equipment used to conduct acceptance tests.
- d. Communications Contractor is responsible for submitting acceptance documentation as defined in section 3.6.5 below.

#### 3.6.3 Test Process

- d. The County reserves the right to be present during any or all of testing.
- e. Testing shall be of the Permanent Link. However, the communications contractor shall warrant performance (see Part 3) based on Channel performance and provide patch cords that meet channel performance.
- f. All cabling not tested strictly in accordance with these procedures shall be re-tested at no additional cost to the County.
- g. 100% of the installed voice and data cabling must be tested. All tests must pass acceptance criteria defined in 3.6.5.d.
- h. Test equipment shall be fully charged prior to each days testing.

#### 3.6.4 Standards Compliance & Test Requirements

- a. Cabling must meet the indicated performance specifications:
  - \_\_\_\_\_ TIA 568B Category 5e
  - \_\_\_\_\_ TIA 568A Category 6 Addendum (draft 5 or latest)
- b. All test equipment used must meet the performance specifications defined in section 3.6.6. below.

#### 3.6.5. Documentation

- a. Test reports must be submitted in hardcopy and electronic format. Hand-written test reports are not acceptable.

- b. Hardcopy reports are to be submitted in labeled 3 ring binders with an attached affidavit verifying passing execution of all tests. For large installations electronic reports with hardcopy summaries are preferred. Hardcopy summary reports shall contain the following information on each row of the report: circuit ID, test specification used, length, date of test, and pass/fail result.
- c. Electronic reports are to be submitted on CD-ROM only. If proprietary software is required to view test results, the software shall be provided to ISD Telecommunications Systems Engineer and appropriated Library Staff. If the results are delivered in a standard format like Excel, Access, CSV files, etc. then software to read these files need not be provided. Electronic reports must be accompanied by a Certificate signed by an authorized representative of the Contractor warranting the truth and accuracy of the electronic report. Certificate must reference traceable circuit numbers that match the electronic record.
- d. Test reports shall include the following information for each cabling element tested:
  - i. Wiremap results that indicate the cabling has no shorts, opens, miswires, split, reversed, or crossed pairs, and end to end connectivity is achieved.
  - ii. For Category 5e or 6 cabling: Attenuation, NEXT, PSNEXT, Return Loss, ELFEXT, and PSELFEXT data that indicate the worst case result, the frequency at which it occurs, the limit at that point, and the margin. These tests shall be performed in a swept frequency manner from 1 MHz to highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements. Information shall be provided for all pairs or pair combinations and in both directions when required by the appropriate standards. Any individual test that fails the relevant performance specification shall be marked as a FAIL.
  - iii. Length (in meters), propagation delay, and delay skew relative to the relevant limit. Any individual test that fails the relevant performance specification shall be marked as a FAIL.
  - iv. Cable manufacturer, cable model number/type, and NVP
  - v. Tester manufacturer, model, serial number, hardware version, and software version
  - vi. Circuit ID number and project name
  - vii. Autotest specification used
  - viii. Overall pass/fail indication
  - ix. Date of test
  - x. Test reports shall be submitted within 7 business days of completion of testing.

### 3.7.6 Test Equipment

- a. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years experience in producing field test equipment. Manufacturers must be ISO 9001 certified.
- b. All test tools of a given type shall be from the same manufacturer, and have compatible electronic results output.

- c. Test adapter cables must be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable.
- d. Baseline accuracy of the test equipment must exceed TIA Level III, as indicated by independent laboratory testing.
- e. Test equipment must be capable of certifying Category 5e and 6 links.
- f. Test equipment must be capable of storing full frequency sweep data for all tests and drawings color graphical reports for all swept measurements.
- g. Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
- h. Test equipment must be capable of running individual NEXT, return loss, etc measurements in addition to autotests. Individual tests increase productivity when diagnosing faults.
- i. Test equipment must include a library of cable types, sorted by major manufacturer.
- j. Test equipment must store Category 5e or 6 autotests in internal memory.
- k. Test equipment must be able to internally group autotests and cables in project folders for good records management.
- l. Test equipment must include DSP technology for support of advanced measurements.
- m. Test equipment must make swept frequency measurements in compliance with TIA standards.
- n. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.

#### 3.7.7. Fiber

- a. The communications contractor shall perform end-to-end fiber optic strand testing per Los Angeles County Fiber Testing Standard with the following minimum quality levels: Optical Time Domain Reflectometer (OTDR) with drawingsout (both directions) and absolute dB loss (power meter), at 850 nanometers for multi-mode and 1310 nanometers for single-mode. All fiber optic cable lengths less than 600 feet shall require a certified kilometer to be used with the OTDR testing equipment. After testing on the reel has been successfully completed, fiber optic system shall be installed with all patch cords attached and then the entire channel shall be tested.
- b. The communications contractor shall perform two sets of OTDR drawingsouts with the above mentioned minimum quality levels. The first OTDR reading and drawingsout must be done on-site and submitted to the Project Manager prior to the utilization of the fiber, and the second OTDR reading and drawingsout must be done after installation.

- c. Upon completion of the fiber optic portion of this project, the communications contractor shall provide two complete sets of OTDR traces on 8 1/2 x 11" sheets. The communications contractor shall annotate on each OTDR trace 1) direction of test per strand (from-to); 2) bundle number; 3) buffer color and 4) strand color. Communications contractor-provided representations of the test data are not acceptable.

### 3.8 VOICE/COMMUNICATIONS SYSTEMS

#### 3.8.1. System Description and Installation Requirements

- f. The communications contractor shall furnish, install, and make operational a complete Norstar-PLUS Modular ICS telephone system Analog Trunk configuration, wired and equipped with \_\_\_\_\_ trunks and \_\_\_\_\_ stations and all associated equipment to make the system operational. The telephone system shall be installed in the MCR as indicated on the drawings.
- g. The communications contractor shall furnish and install a total of \_\_\_\_\_ ( ) model M7208 instruments. The communications contractor shall furnish and install \_\_\_\_\_ ( ) model T7316 instruments as noted on drawings for the new facility. The communications contractor shall furnish and install \_\_\_\_\_ ( ) model M7406 (Black only) Cordless instruments as noted on drawings for the new facility. All telephones shall be color ash or gray as determined by Library Staff.
- h. Library Staff shall provide the communications contractor with all the information required to develop the user database (i.e., key sheets, numbering plan, class of service, number of analog and digital phones, etc.). The information shall be forwarded to the communications contractor six (6) weeks prior to the scheduled cut-over date. Change requests submitted in the (six week) interim will be held until after cutover and then processed as a change order on a time and material basis.
- i. One week after the telephone system is in full operation the communications contractor and ISD Telecommunications Systems Engineer and Library Staff will test all newly installed equipment. A Certificate of Acceptance will be signed by the ISD Telecommunications Systems Engineer and Library Staff. The warranty of the telephone system will start on the signature date.
- j. The communications contractor shall cross-connect fax and modem lines and trunks as required and determined by ISD Telecommunications Systems Engineer and Library Staff. Trunks and locations for faxes and modems to be determined during installation.
- k. The communications contractor shall provide paging port connection to paging amplifier using an RJ14-to-Spade terminating cable.
- l. The communications contractor shall provide two (2) RJ45 jacks adjacent to alarm panel for dial tone for the alarm system. The lines to be used will be ordered by County Library Staff. The communications contractor will terminate the lines on the blocks. The alarm contractor will terminate the lines into the alarm.
- m. The communications contractor shall provide and install in the relay rack a 110-type

termination Cat5e patch panel, Panduit P/N DP485E88110U for voice patching capabilities. The voice cables from the telephone system shall be terminated on this panel.

- n. The telephone system shall be equipped with Startalk Auto-Attendant and voice mail to support the number of users and lines. The Library Staff will be responsible for sizing the system.

### 3.9 MEETING ROOM

### 3.10 EQUIPMENT RACKS / MOUNTINGS

- a. The contractor shall provide and install equipment racks that are earthquake rated for zone 4 and shall be securely installed according to Los Angeles County Standard 108. This standard will require the use of a 3-inch spacer bar P/N STD108DET4).
- b. The contractor shall provide and install standard 7' by 19" aluminum relay rack(s) (Chatsworth P/N 48353-703, color Black, shelves and cable trays as specified in the attached drawing. The contractor shall install, position, reposition, or remove racks and equipment as required without disruption of ongoing services. The contractor shall furnish extension cables, power taps, or temporary racks if needed.
- c. All equipment racks shall be augmented with horizontal and vertical management hardware, both front and rear, to properly dress cables and patch cords. Wire management hardware by Panduit (WMBVC).
- d. The number of equipment racks shall be determined by ISD Telecommunications Engineer and Library Staff. The number shall be dependent on the size of the Library.
- e. All voice/data cables shall be terminated on separate patch panels in the MCR. Patch panels shall be dedicated to voice, STAFF data, and PUBLIC data. See section 3.4 for requirements. The cables shall be terminated and label sequentially on the patch panels.
- f. Cable trays shall be Chatsworth Products, INC. (CPI) P/N 11252-713. Color, black.
- g. All structural ironwork shall be UL-certified, providing the best bonding for static and grounding. Painted structural ironwork is not allowed.
- h. Cable tray shall be of the tubular type construction. The tray shall be installed with the rungs on the topside of the tray. All attachments to drywall shall be on ¾" plywood.
- i. Cable tray shall be 7'3" from the finish floor. This will require the installation of a 3" (Black) spacer manufactured by B-Line Systems, INC., P/N STD108DET4. The 7'3" allows for the cable tray to be positioned over the 7' doorway.
- j. Structural cable tray, relay racks, cabinets, systems, attachments and earthquake bracing shall comply with Zone 4 earthquake, NEMA, NEC and TIA/EIA-569 standards. Floor mounting hardware shall be a 3/8" bolt, lock washer, flat washer, with anchor in the floor, quantity as required.

- k. All exposed cut and sharp edges shall be deburred and filed to a safe finish. Cable tray runway ends shall be capped with a black rubber cap.
- l. Relay racks shall be high strength aluminum construction with universal 5/8"-5/8"-1/2" tapped mounting hole #12-24 thread pattern on both front and rear. Designed and seismic built to the EIA-310C Standard.
- m. All equipment racks shall be augmented with horizontal and vertical management hardware, both front and rear, to properly dress cables and patch cords. Wire management hardware shall be by Panduit.
- n. The communications contractor shall install, position, reposition, or remove racks and equipment as required without disruption of ongoing services. The communications contractor shall furnish extension cables, power taps, or temporary racks if needed.

#### PART 4 EXECUTION

##### 4.1 INSTALLATION

###### A. General

All equipment shall be installed in accordance with the published practices of the equipment manufacturer, applicable FCC regulations, generally accepted industry standards, cited codes and standards, and these specifications.

###### B. Temporary Installation

The contractor shall temporarily install all electronic equipment for the final tests of the equipment and the systems, and then shall remove and store all equipment which is not built-in until occupancy by County personnel. The contractor shall then return and make complete and final installation and check-out.

###### C. Equipment Not Installed

Equipment not meant for installation and all spares shall be delivered on site, to Library Capital Projects Staff and secured.

###### D. Wiring

Terminations and connections throughout all systems shall employ one of the following methods:

1. Solder terminals, telephone-type punch terminal strips or machine wire-wrapped terminals in all cabinets.
2. Crimp connectors at outlet boxes and screw type or plug and socket connections at all equipment. Note that crimp-type connections are approved only for stranded wire.
3. 66-Type blocks shall only be used for voice distribution cables. They are not permitted for any other installation.

E. Labels

All controls, function switches, etc. shall be clearly labeled on all equipment panels. This labeling shall be permanently etched or engraved. Neat nameplates engraved on two-layer plastic and affixed with epoxy glue may be used.

F. Flexible Wire

Stranded wire and flexible cable shall be used for all connections to equipment not permanently attached to walls, floors or racks.

G. Conduits

1. Thin wall conduit shall be used for conduits 2" in diameter or less. For conduits over 2" in diameter, rigid steel galvanized shall be used. However, if it is necessary to use flex duct or plastic PVC, prior approval must be obtained in writing from ISD Telecommunications Systems Engineer and the next larger size flex duct or PVC shall be used. The flex shall be anchored at all bends and runs between bends must be straight and non-zigzagging through studding, joints, etc. If PVC conduit is to be used, use steel galvanized conduit for all bends over 15 degrees.
2. All communications conduit shall be one (1) inch inside diameter unless otherwise noted on the drawings.
3. A 1/4 inch nylon pull line shall be installed in each conduit. For conduits over two (2) inch in diameter, provide three-eighth (3/8) inch nylon pull line.
4. All conduits shall be clearly and permanently identified at all terminals or cabinets as to its terminating end.
5. Individual communications conduit runs shall not have more than the equivalent of two (2) 90-degree bends, the ISD Telecommunications Systems Engineer shall be contacted to determine the size, type and location of a pull box that must be installed. Pull boxes shall not be used for transitions in conduit runs.
6. The radius of any conduit bend shall not be less than ten (10) times the inside diameter of the conduit. Except conduit for fiber optic cable. The conduit-bending radius shall have a minimum of 20 times of the O.D. of the install fiber optic cable.
7. Open ends of conduit shall be plugged during construction to prevent the entrance of moisture or foreign material. If moisture or foreign material is found at the time telephone and data cables are being installed, it shall be the responsibility of the contractor to thoroughly clean the conduit before the cable installation proceeds.
8. All conduits shall be securely fastened in place and shall be free from burrs, defects or obstructions that could interfere with the installation of cables.

9. All conduit, unless otherwise noted on drawings, shall terminate on designated communications backboards either three (3) inches above the floor or six (6) inches below the ceiling.
10. All conduits shall be reamed and secured by locknut where applicable. All conduits shall have bushings on both ends.
11. All conduit not terminating in terminals, cabinets or outlet boxes shall be capped.
12. Conduit and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign objects or other defects.
13. Empty conduit/sleeves, unless noted otherwise, shall be run to and between respective communications rooms and/or closets, as shown on the plans.
14. All underground communications conduit shall be PVC and shall have a minimum earth cover of eighteen (18) inches, except where subject to vehicular traffic (including road right-of-way) the PVC conduit shall be concrete encased with a minimum of thirty (30) inches of earth cover. Telephone conduit may be buried in the same trench as power (480 Volts or less) if separated by a minimum of three (3) inches of concrete or twelve (12) inches of dirt.
15. The number of outlets included in each home run shall be specifically limited, as shown on the plans, and shall not be exceeded.
16. The ISD Telecommunications Systems Engineer is responsible for duct assignments and shall be contacted before the installation of cables in the conduits.
17. Any deviation/substitution must be verified and approved in writing by the ISD Telecommunications Systems Engineer prior to use.

#### H. Outlets

All communications outlets shall be installed at the same height above the finished floor, unless otherwise noted on the drawings, as the electrical outlets, and shall be:

1. For single conduit entrance, 4 11/16 inches x 2 1/8 inches x 2 1/8 inches.
2. For two (2) or more conduit entrances, 4 11/16 inches x 4 11/16 inches x 2 1/8 inches.
3. Plaster rings are required. Tiger Box rings may not be used.
4. All core-drilled holes in counter tops shall be three (3) inches in diameter. A removable/reusable grommet and cover shall be installed.

## 4.2 ACCEPTANCE AND TEST INSPECTION

- A. Final tests and inspection shall be conducted after the contractor has submitted the Final Submittal. The final acceptance tests and inspection shall demonstrate the proper operation of each systems and its compliance with the drawings and specifications.
- B. Written procedures for the tests not included above shall be prepared by the contractor and submitted for review and approval by the ISD Telecommunications Systems Engineer and Library Staff at least 30 days prior to the test. The contractor shall supply personnel and, wherever required, auxiliary equipment for the test, without cost to the County.
- C. The County reserves the right to conduct, using contractor equipment and labor, a random re-test of up to five (5) percent of the cable plant to confirm documented results. Random re-testing, if performed, shall be at the expense of the contractor, using standard labor rates. Any failing cabling shall be re-tested and restored to a passing condition. In the event more than two (2) percent of the cable plant fails during re-test, the entire cable plant shall be re-tested and restored to a passing condition at no additional cost to the County.

#### 4.3 TRAINING

- A. The contractor shall conduct training on each product in PART 2, except that the County may waive training on any products with which the County technicians and operators are already trained or for which training is inappropriate. The contractor shall furnish the services of a competent instructor for classroom and hands-on instruction in the operation and maintenance of the equipment supplied. The training shall be sufficient to qualify County technicians to maintain the equipment and systems.
- B. All training, plans, and materials shall be submitted by the contractor for review and approval by the ISD Telecommunications Systems Engineer at least 30 days prior to acceptance tests.
- C. Classroom space for training will be provided by the County. All training classes shall be conducted on a mutually agreeable schedule prior to system acceptance.
- D. Operator training curriculum, if required, shall be comprehensive enough to enable County personnel receiving initial training to independently conduct training classes and instruct other operators. The contractor shall conduct training and furnish training materials for up to 20 students, as determined by County.
- E. Maintenance training. The communications contractor, if required, shall include in his maintenance training plan the recommended duration of maintenance training necessary to thoroughly cover the subject matter. This plan is subject to revision based upon County review.
- F. The contractor shall furnish training materials to each student, which they shall keep. The training material shall include the Systems Manual, less appendices. Maintenance training shall be conducted twice to provide training for up to 10 students in each session.
- G. The contractor shall provide one formal, technical training seat for each product installed.